

Switchgrass

REFERENCE MATERIAL

Pedigree

Institution: Oklahoma State University
Location: Garvin County, OK
Cultivar: Alamo

Harvested: 2012
Received at INL: 2013
Sample Preparation: Ground to pass through a 1-inch sieve using a Vermeer BG480 grinder

Composition

Table 1. Chemical composition^a of Reference Switchgrass

%Structural Ash	%Extractable Inorganics	%Structural Protein	%Extractable Protein	%Water Extracted Glucan ^b
1.88	2.07	1.51	0.54	2.28
%Water Extracted Xylan ^b	%Water Extractives Others	%EtOH Extractives	%Lignin	%Glucan
0.09	6.68	2.68	16.24	33.21
%Xylan	%Galactan	%Arabinan	%Acetic Acid	%Total
21.65	1.43	3.27	3.07	96.60

^aDetermined using NREL "Summative Mass Closure" LAP (NREL/TP-510-48087)

^bDetermined by HPLC following an acid hydrolysis of the water extractives

Proximate, Ultimate & Calorimetry

Table 2. Proximate, ultimate, and calorific values for Reference Switchgrass (reported on a dry basis)

Proximate ^a			Ultimate ^b			Calorimetry ^c	
%Volatile	%Ash	%Fixed Carbon	%Hydrogen	%Carbon	%Nitrogen	HHV	LHV
80.2	4.2	15.6	5.7	47.2	0.5	8077	6749

^aProximate analysis was done according to ASTM D 5142-09

^bUltimate analysis was conducted using a modified ASTM D5373-10 method (Flour and Plant Tissue Method) that uses a slightly different burn profile

^cHeating values (HHV, LHV) were determined with a calorimeter using ASTM D5865-10

Elemental Ash

Table 3. *Elemental ash composition^a of Reference Switchgrass*

%Al as Al ₂ O ₃	%Ca as CaO	%Fe as Fe ₂ O ₃	%K as K ₂ O	%Mg as MgO	%Mn as MnO	%Na as Na ₂ O	%P as P ₂ O ₅	%Si as SiO ₂	%Ti as TiO ₂	%S as SO ₃
0.25	7.37	1.63	17.55	9.79	0.19	1.61	4.45	53.53	0.01	2.73

^aDetermined as described in ASTM standards D3174, D3682 and D6349

Particle Characteristics

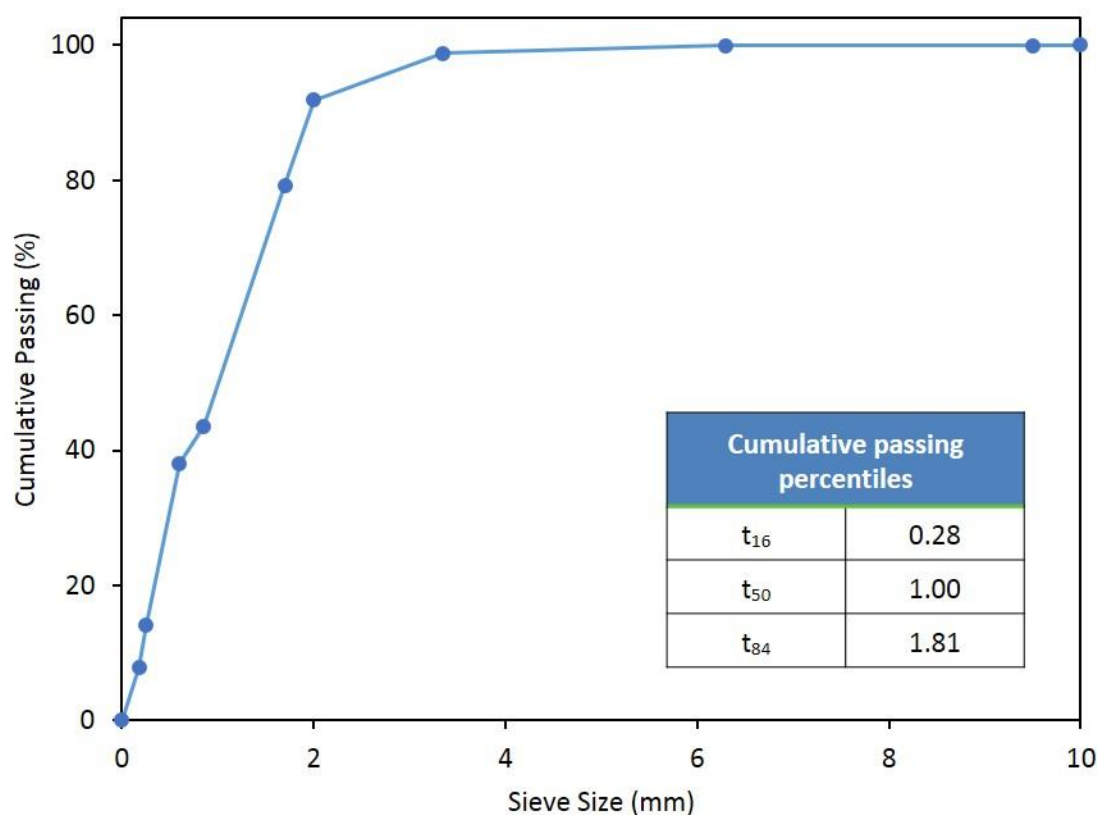


Figure 1. *Cumulative passing percent of 1-inch Reference Switchgrass determined according to ANSI/ASAE S319.4 using a Ro-Tap test sieve shaker (Model RX-29, W.S. Tyler) and a 15 minute total sieving time. The cumulative passing percentile sieve sizes (e.g., t_{16}) were calculated by interpolation and represent theoretical sieve sizes that would retain 16, 50 or 84% of the particles by mass.*

Contact

For questions regarding biomass material or analytical data please contact Dr. Garold Gresham at garold.gresham@inl.gov or 208-526-6684.